LOWER PASSAIC RIVER RESTORATION PROJECT

LOWER PASSAIC RIVER STUDY AREA RI/FS

LATE SPRING/EARLY SUMMER 2010
FISH COMMUNITY SURVEY
ADDENDUM TO THE
QUALITY ASSURANCE PROJECT PLAN

FISH AND DECAPOD CRUSTACEAN TISSUE COLLECTION
FOR CHEMICAL ANALYSIS
AND FISH COMMUNITY SURVEY

FINAL

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Acronyms

CPG	Cooperating Parties Group
CPUE	catch-per-unit effort
LPRSA	Lower Passaic River Study Area
NJDEP	New Jersey Department of Environmental Protection
NJDOT	New Jersey Department of Transportation
NOAA	National Oceanic and Atmospheric Administration
QAPP	quality assurance project plan
RM	river mile
SOP	standard operating procedure
USACE	US Army Corps of Engineers
USEPA	US Environmental Protection Agency
USFWS	US Fish and Wildlife Service
Windward	Windward Environmental LLC

Introduction

This is an addendum to the *Lower Passaic River Restoration Project Quality Assurance Project Plan: Fish and Decapod Crustacean Tissue Collection for Chemical Analysis and Fish Community Survey* (Windward 2009), hereafter referred to as the Fish/Decapod Quality Assurance Project Plan (QAPP). The Fish/Decapod QAPP reviewed by the US Environmental Protection Agency (USEPA) and its Partner Agencies[1] and approved by USEPA on August 6, 2009, specified that three fish community surveys would be conducted; these would include a summer 2009 survey, a winter 2010 survey, and a spring 2010 survey. This addendum to the Fish/Decapod QAPP, hereafter referred to as the Fish/Decapod QAPP Addendum No. 3, describes the late spring/early summer 2010 fish community survey that will be conducted to qualitatively assess the fish community in the Lower Passaic River Study Area (LPRSA).

Field activities will occur during the late spring/early summer 2010 over a 2-to-3-week-period. Data to be collected will include the diversity and abundance of fish species present during the late spring/early summer and their physical characteristics (i.e., weight, length, and gender [when practicable]), as well as fish health assessments (i.e., gross internal and external pathology observations) on a subset of the fish caught. The late spring/early summer 2010 fish community survey will be conducted concurrent with the late spring/early summer 2010 fish tissue collection effort (described in the Fish/Decapod QAPP Addendum No. 4 (Windward 2010b).

The Fish/Decapod QAPP Addendum No. 3 includes updates to worksheets and attachments relevant to the late spring/early summer 2010 fish community survey. It does not include worksheets or attachments that are unchanged or not relevant to this effort. Applicable and/or updated worksheets and attachments included in this addendum are presented below:

- Worksheet No. 1 contains the title and approval pages for the addendum.
- Worksheet No. 3 provides the distribution list.
- Worksheet No. 10 describes the specific problem definition.
- Worksheet No. 11 provides the project quality objectives.
- Worksheet No. 18 provides a list of proposed sampling locations.

[1] The Partner Agencies include the US Army Corps of Engineers (USACE), New Jersey Department of Environmental Protection (NJDEP), New Jersey Department of Transportation (NJDOT), National Oceanic and Atmospheric Administration (NOAA), and the US Fish and Wildlife Service (USFWS).

QAPP Worksheet No. 1. Title and Approval Page

Addendum to the *Quality Assurance Project Plan for Fish and Decapod Crustacean Tissue Collection for Chemical Analysis and Fish Community Survey*

Document Title

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QAPP Worksheet No. 10. Problem Definition

The problem to be addressed by the project:
The third of three seasonal fish community surveys will be conducted to document fish species that are present in the LPRSA in the late spring/early summer. This information will complement the fish community surveys conducted in the LPRSA during the late summer/early fall 2009 (Windward 2010a) and winter 2010. Data from the winter 2010 survey will be reported with the late spring/early summer 2010 survey. Because previous investigations (e.g., Tierra Solutions 2002) focused primarily on the lower portion of the LPRSA (River Mile [RM] 1 to RM 7), there are very few fish community data available for the upper portion of the LPRSA (from approximately RM 7 to RM 17.4). The results of three seasonal surveys over the entire 17.4-mile stretch of the LPRSA will provide more comprehensive information about the LPRSA fish community.
The environmental questions being asked:
The specific question covered in this addendum is: “What species of fish are present in the LPRSA during the late spring/early summer months?” The catch results will be used to qualitatively assess what fish are present in the LPRSA during the late spring/early summer months. These data will be compared with the catch results from the late summer/early fall 2009 (Windward 2010a) and winter 2010 (Windward in prep) fish community surveys and used to determine the relative abundance, structure, and indices of the fish community over multiple seasons. These data will provide qualitative information about the overall health of the LPRSA fish population.
The rationale for sample location and gear type:
The late spring/early summer 2010 fish community survey will be conducted according to the plan presented in the Fish/Decapod QAPP (Windward 2009), which specified that a subset of locations sampled during the first community survey would be revisited as part of the subsequent community surveys conducted the following winter and spring. The targeted locations and sampling methods for the late spring/early summer 2010 fish community survey have been selected based on catch results from the first survey conducted during late summer/early fall 2009 and include the use of similar sampling methods (i.e., backpack and boat electrofishing, minnow traps, eel traps, trotlines, and gillnets) (Windward 2010a). Crab traps will also be used during the late spring/early summer 2010 fish community survey at the request of USEPA. Two locations in each 2-mile reach between RM 0 and RM 14 and the 3.4-mile reach between RM 14 and RM 17.4 will be revisited using each of the sampling methods. Locations where minnow traps, eel traps, and trotlines will be deployed are locations that were also targeted during the winter 2010 fish community survey (Windward 2010b). Based on agreements between the Cooperating Parties Group (CPG) and USEPA, fishing methods used during the winter survey were limited to traps and trotlines and excluded the use of electrofishing and gillnets. The rationale for the fishing methods used during the winter 2010 fish community survey is provided in the Fish/Decapod QAPP Addendum No. 1 (Windward 2010b).

QAPP Worksheet No. 10. Problem Definition

All locations for the late spring/early summer 2010 fish community survey have been positioned so that a range of habitat and shoreline conditions representative of the LPRSA are included and roughly equal numbers of sampling locations are positioned on each bank (described as “east” and “west”).
Project decision conditions:
The conditions for project decisions (i.e., those decisions that may require communication between CPG and USEPA during the field effort) include the need to relocate sampling locations within the LPRSA and the need to delay or suspend sampling because of hazardous weather conditions. The CPG will immediately suspend operations under conditions of extreme weather and/or environmental conditions that are a threat to worker health and safety.

QAPP Worksheet No. 11. Project Quality Objectives/Systematic Planning Process Statements

Who will use the data?
The data collected under the Fish/Decapod QAPP Addendum No. 3 will be used by CPG and USEPA for Comprehensive Environmental Response, Compensation, and Liability Act-related decisions, specifically for the ecological risk assessment, and by other interested parties (e.g., USACE, NJDEP, USFWS, NJDOT, and NOAA) for other purposes, including Water Resources Development Act activities, such as restoration planning.
What will the data be used for?
The data collected during the late spring/early summer 2010 fish community survey will be used in conjunction with information from the other two surveys (i.e., the late summer/early fall 2009 and winter 2010 fish community surveys) to qualitatively assess the fish community in the LPRSA. The fish community survey data will include the identification of fish species collected and measurements of fish length and weight. These data and data from the winter 2010 fish community survey will be used to identify the fish species present in the LPRSA during the winter and the late spring/early summer. Community metrics and the catch-per-unit effort (CPUE) will be calculated for each survey (i.e., winter and late spring/early summer fish community surveys) in a manner similar to that presented in the late summer/early fall 2009 fish and decapod field report (Windward 2010a). The comparisons among the three seasonal community surveys will be limited to a qualitative assessment because of the differences in survey durations (i.e., 10 to 15 days for the late spring/early summer 2010 fish community survey compared with 11 days for the winter 2010 fish community survey and 36 days for the late summer/early fall 2009 fish community survey) and in the fishing methods (i.e., gillnetting and electrofishing were not included in the winter 2010 fish community survey). Statistical comparisons of CPUE or community metrics among the seasonal fish community surveys will not be conducted. Additional gross external and internal health assessment data will be collected on up to five fish per species for which health assessment goals were not met during the combined late summer/early fall 2009 and winter 2010 fish community surveys. This information will be evaluated to characterize the health of the fish community present in the LPRSA.
What types of data are needed?
The data types are presented above, under the question: “What will the data be used for?” They include: • The identification of fish species collected and associated measurements (i.e., length and weight) • The evaluation of gross external and internal pathology on up to five fish per species for which pathology goals were not met during the combined late summer/early fall 2009 and winter 2010 fish community surveys

QAPP Worksheet No. 11. Project Quality Objectives/Systematic Planning Process Statements

Matrix
Fish community survey observations, including the identification of species, length, weight, and gender (if practicable) of individuals and the numbers of fish caught by species, will be compiled for the late spring/early summer 2010 fish community survey. As described in the Fish/Decapod QAPP (Windward 2009), community survey observations for the late spring/early summer 2010 fish community survey will be compiled for all fish caught; fish will be released back into the river unless they are needed to meet fish health assessment requirements or are a species targeted for tissue analysis, as described in the Fish/Decapod QAPP Addendum No. 4 (Windward 2010b).
How "good" do the data need to be in order to support the environmental decision?
The late spring/early summer 2010 fish community survey is designed to qualitatively assess the fish community of the LPRSA during late spring/early summer. The qualitative assessment includes the identification of fish genus and species, identification of gender (when practicable), measurement of length accurate to ±1 mm, and measurement of weight accurate to ±0.5 g for fish weighing less than 60 g, ±50 g for fish weighing up to 5,000 g, and ±200 g for fish weighing up to 20,000 g, depending on the scale required. The data collected will be used in conjunction with the qualitative data collected from the late summer/early fall 2009 and winter 2010 fish community surveys (Windward 2010a, Windward in prep).
How many data are needed?
The proposed number of locations targeted during the late spring/early summer 2010 fish community survey is consistent with the Fish/Decapod QAPP Addendum No. 1 (Windward 2010c), which describes the winter 2010 fish community survey plan. All fish specimens collected during the late spring/early summer 2010 survey will be included in the community survey dataset. Sampling locations are described under the question: "Where will data be collected?" In addition, gross internal and external pathology evaluations will be conducted on up to five fish per species for which pathology goals were not met during the late summer/early fall 2009 or winter 2010 fish community surveys. A summary of the number of fish per species that underwent pathology evaluations during the late summer/early fall 2009 and winter 2010 fish community surveys is presented in Table 11-1; this information will be used to determine how many specimens per species collected during the late spring/early summer 2010 fish community survey should be evaluated (i.e., up to five specimens per species that were either not collected at all or fewer than five specimens total were collected during the previous two surveys).
Where, when, and how should the data be collected/generated?
A summary of the sampling locations and field survey methods is presented below.

QAPP Worksheet No. 11. Project Quality Objectives/Systematic Planning Process Statements

Where will the data be collected?

The selected sampling locations (and the rationale for each location) for the late spring/early summer 2010 fish community survey are presented in Worksheet No. 18 of this addendum and illustrated in Figure 1. Two locations from each 2-mile reach between River Mile (RM) 0 and RM 14 and from the 3.4-mile reach between RM 14 and RM 17.4 that were targeted during the winter 2010 fish community will be retargeted for the late spring/early summer fish community survey using minnow traps, eel traps and trotlines. Crab traps will also be used during the late spring/early summer 2010 fish community survey at the request of USEPA. Two additional locations within each reach will be targeted using either electrofishing or gillnets. The specific sampling locations selected for electrofishing or gillnets are based on catch results (e.g., abundance and diversity of fish) for those methods during the late summer/early fall 2009 fish community survey. In general, the sampling locations that had the greatest fish abundance and diversity were selected for sampling in late spring/early summer 2010. The selected locations have also been positioned so that a range of habitat and shoreline conditions representative of the LPRSA are included (based on the qualitative habitat information collected during the late summer/early fall 2009 field effort (Windward 2010a)) and approximately equal numbers of sampling locations are positioned on each bank (described as “east” and “west”).

When will the data be collected?

The late spring/early summer 2010 fish community survey will be conducted during a 2-to-3-week period concurrent with the late spring/early summer 2010 fish tissue collection effort (described in the Fish/Decapod QAPP Addendum No. 4 (Windward 2010b). The late spring/early summer 2010 fish community survey is expected to begin the week of June 21, 2010. Each fishing method (as described below, under the question: “How will the data be collected?”) will be attempted up to two times per location and will proceed as follows:

- In each reach, traps, trotlines, and gillnets (if using) will be deployed at each location the first day; retrieved, checked, and redeployed the next day; and then retrieved the third day before the field team moves on to the next reach.
- Electrofishing will be conducted in two swaths per location (each being 15 to 30 minutes in duration) on two separate days.

Sampling attempts will be conducted in two reaches each day.

How will the data be collected?

Fishing methods for the late spring/early summer 2010 fish community survey will include electrofishing and the use of minnow traps, eel traps, trotlines, and gillnets. Crab traps will also be used during the late spring/early summer 2010 fish community survey at the request of USEPA. In accordance with previous agreements between USEPA and CPG, the use of lethal fishing methods (i.e., gillnets) will be minimized, when possible, in favor of less lethal methods (i.e., electrofishing). However, electrofishing is dependent upon the salinity of the water, and may not be possible in most of the estuarine reaches (electrofishing was conducted in Reaches 4, 5, 6, 7, and 8 during the late summer/early fall 2009 fish community survey). During the late

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summer/early fall 2009 fish community survey, both electrofishing and the use of gillnets resulted in higher CPUE and diversity of catch than did the more species-specific fishing methods (i.e., traps and trotlines (Windward 2010a)). Therefore, in reaches where electrofishing is not possible because of high salinity, gillnets will be deployed. Salinity (determined through field measurements of conductivity) will be used to decide whether gillnets or electrofishing will be used in the estuarine reaches. Ideal conductivity for electrofishing is between 0.04 and 0.4 mS/cm; electrofishing is less efficient in water with high conductivity. Therefore, gillnets will be used at locations where conductivity exceeds 0.4 mS/cm, unless USEPA and CPG agree to conduct electrofishing in these areas.

The community survey sampling protocol for all fishing methods will be based on the standard operating procedures (SOPs) detailed in Attachment J: SOP—Fish Surveys, collection, and Tissue Sampling and Attachment L: SOP—Fish Collection by Backpack and Boat Electrofishing, which were included in the Fish/Decapod QAPP(Windward 2009). These SOPs have since been revised, and the revised SOPs are included in the Fish/Decapod QAPP Addenda No. 4 (Windward 2010b). Traps will be deployed on or near shallower mudflat areas, and trotlines will be deployed perpendicular to the shore in deeper water. If necessary, trotlines may be deployed across the channel or from the bank opposite of the trap locations, in areas where there is more suitable habitat and deeper water. Electrofishing will be conducted in areas accessible by boat or in shallow wadable waters where backpack electrofishing is appropriate. Gillnets will be deployed in areas with deeper water.

All fish species collected will be identified and measured (i.e., length, weight). Gross internal and external pathology examinations will be conducted on up to five specimens per species for which pathology goals have not yet been met (a summary of the number of pathology evaluations per species conducted during the previous two surveys is presented Table 11-1). The pathology evaluations will follow the procedures outlined in Hunn (1988) and USGS (2002) as specified in the Fish/Decapod QAPP (Windward 2009).

All changes to the proposed plan as a result of field conditions will be communicated between USEPA and CPG technical coordinators or project managers.

Who will collect and generate the data?

Windward will provide the field sampling coordination and most of the field personnel required to conduct the late spring/early summer 2010 fish community survey. Windward will be supported by its contractor Aqua Surveys, Inc., as well as de maximis, inc., and AECOM field personnel, as required.

How will the data be reported?

Updates will be communicated (e.g., via telephone conversation, e-mail) to CPG project managers and project coordinators.

An electronic database that includes the coordinates for the location where each trap and trotline is deployed, as well as for each

QAPP Worksheet No. 11. Project Quality Objectives/Systematic Planning Process Statements

fish collected, will be maintained. The database will include the time of trap deployment and retrieval; time of fish collection; depth of collection or trap deployment; and species, length, weight, and (if determinable) gender of all individual fish caught.

A data summary report presenting the abundance and diversity of fish species collected will be provided within 90 working days after the completion of the late spring/early summer 2010 fish community survey and will include the data from the winter 2010 fish community survey. A summary of lengths and weights by species and dominance by catch effort will also be presented. In addition, the report will include a map that presents the locations and corresponding information on habitat type, if available. The data summary report will present any modifications to the proposed sampling plan outlined in this QAPP addendum or the Fish/Decapod QAPP Addendum No. 1 (Windward 2010c).

How will the data be archived?

Data records, forms, and notes will be scanned and stored electronically in a project file. Hard copies will be archived at Windward's main office in Seattle, Washington. Similarly, the data reports will be issued and then archived electronically and as hard copies.

QAPP Worksheet No. 11. Project Quality Objectives/Systematic Planning Process Statements

Table 11-1. Fish collected during the late summer/early fall 2009 and winter 2010 fish community surveys that underwent pathology evaluations

Species	Scientific Name	No. of Fish that Underwent Pathology Evaluations
American eel	*Anguilla rostrata*	5
Atlantic menhaden	*Brevoortia tyrannus*	5
Atlantic silverside	*Menidia menidia*	5
Banded killifish	*Fundulus diaphanous*	1
Black crappie	*Pomoxis nigromaculatus*	3
Bluegill	*Lepomis macrochirus*	5
Bluefish	*Pomatomus saltatrix*	5
Channel catfish	*Ictalurus punctatus*	1
Common carp	*Cyprinus carpio*	7
Gizzard shad	*Dorosoma cepedianum*	1
Goby (unspecified)	NA	5
Hogchoker	*Trinectes maculatus*	1
Northern searobin	*Prionotus carolinus*	1
Pumpkinseed	*Lepomis gibbosus*	5
Redbreast sunfish	*Lepomis auritus*	5
Satinfin shiner	*Notropis analostanus*	3
Silver perch	*Bairdiella chrysoura*	1
Smallmouth bass	*Micropterus dolomieu*	5
Spottail shiner	*Notropis hudsonius*	5
Striped bass	*Morone saxatilis*	5
Striped mullet	*Mugil cephalus*	1
Tessellated darter	*Etheostoma olmstedi*	1
Weakfish	*Cynoscion regalis*	1
White catfish	*Ameiurus catus*	3
White perch	*Morone americana*	2
White sucker	*Catastomus commersoni*	5

QAPP Worksheet No. 11. Project Quality Objectives/Systematic Planning Process Statements

Table 11-1. Fish collected during the late summer/early fall 2009 and winter 2010 fish community surveys that underwent pathology evaluations

Species	Scientific Name	No. of Fish that Underwent Pathology Evaluations
Winter flounder	*Pseudopleuronectes americanus*	3

NA – not applicable

QAPP Worksheet No. 18. Proposed Sampling Locations for the Late Spring/Early Summer 2010 Fish Community Survey

Sampling Location[a]	Easting (X)[b]	Northing (Y)[b]	Bank	RM	Fishing Method[c]	Previous Survey Event	Species Previously Collected[d]	Description and Rationale for Sampling Location[e]
Reach 1								
LPR1A	598862	685983	East	0.4	Eel trap, minnow trap, and trotline	Late summer/ early fall 2009 and winter 2010	Atlantic silversides, goby, white perch, and Northern pipefish	Mudflat at Kearney Point; aquatic vegetation along shoreline; depositional area characterized mostly by silt
LPR1D	597403	690438	West	1.25	Eel trap, minnow trap, and trotline	Late summer/ early fall 2009 and winter 2010	Atlantic silversides, goby, white perch, mummichog, and American eel	Shallow mudflat with some riprap; depositional area characterized mostly by silt
LPR1I	597827	691568	West	1.5	Electrofishing/ gillnet	Late summer/ early fall 2009	White perch, Atlantic menhaden, and bluefish	Riprap, vegetation; deeper water
LPR1J	597398	688339	East	0.9	Electrofishing/ gillnet	Late summer/ early fall 2009	White perch, Atlantic menhaden, winter flounder, bluefish, and striped bass	Concrete bulkhead, vegetation; deeper water; downstream of old railroad bridge and near rusted barge
Reach 2								
LPR2B	596928	695100	West	2.3	Eel trap, minnow trap, and trotline	Late summer/ early fall 2009 and winter 2010	Atlantic silversides, white perch, and mummichog	Shallow mudflat between I-295 and Point-No-Point bridges; depositional area characterized mostly by silt and silt and sand
LPR2G	592218	695220	East	3.3	Eel trap, minnow trap, and trotline	Late summer/ early fall 2009 and winter 2010[f]	American eel	Riprap, vegetation, large woody debris; near submerged pilings, deeper water
LPR2I	590155	692581	West	3.9	Electrofishing/ gillnet	Late summer/ early fall 2009	American eel, Atlantic menhaden, bluefish, and white perch	Riprap, overhanging trees and vegetation, woody debris, deeper water
LPR2K	597724	695166	East	2.3	Electrofishing/ gillnet	Late summer/ early fall 2009	Bluefish, white catfish, winter flounder, white perch, and striped bass	Old pier, riprap, overhanging vegetation; deeper water

QAPP Worksheet No. 18. Proposed Sampling Locations for the Late Spring/Early Summer 2010 Fish Community Survey

Sampling Location[a]	Easting (X)[b]	Northing (Y)[b]	Bank	RM	Fishing Method[c]	Previous Survey Event	Species Previously Collected[d]	Description and Rationale for Sampling Location[e]
Reach 3								
LPR3A	588537	692671	East	4.2	Eel trap, minnow trap, and trotline	Late summer/ early fall 2009 and winter 2010	Atlantic silversides and white perch	Shallow mudflat area with aquatic vegetation nearby; depositional area characterized mostly by silt and sand
LPR3K	584668	698342	West	5.75	Eel trap, minnow trap, and trotline	Late summer/ early fall 2009 and winter 2010	White perch, American eel, and brown bullhead	Riprap and wood pilings, deeper water
LPR3M	584798	697881	East	5.7	Electrofishing/ gillnet	Late summer/ early fall 2009	Atlantic menhaden, carp, and white perch	Deep water, vegetation along banks
LPR3O	588368	692495	East	4.2	Electrofishing/ gillnet	Late summer/ early fall 2009	Atlantic menhaden, Atlantic tomcod, striped bass, weak fish, and white perch	Deep water, vegetation along banks
Reach 4								
LPR4D	587489	705720	East	7.3	Eel trap, minnow trap, and trotline	Late summer/ early fall 2009	American eel	Shallow mudflat, no vegetation
LPR4M	585151	701600	West	6.5	Eel trap, minnow trap, and trotline	Late summer/ early fall 2009 and winter 2010	American eel and white perch	Wooden bulkhead with coniferous plants and shrubs on top and several pipes that terminate at the river; depositional area characterized mostly by silt
LPR4R	587094	705442	West	7.2	Electrofishing	Late summer/ early fall 2009	Bluegill, common carp, pumpkinseed, white perch, largemouth bass, redbreast sunfish	Riprap shore with large woody debris, submerged pilings, small mudflat area

QAPP Worksheet No. 18. Proposed Sampling Locations for the Late Spring/Early Summer 2010 Fish Community Survey

Sampling Location[a]	Easting (X)[b]	Northing (Y)[b]	Bank	RM	Fishing Method[c]	Previous Survey Event	Species Previously Collected[d]	Description and Rationale for Sampling Location[e]
LPR4S	588168	706783	East	7.5	Electrofishing	Late summer/ early fall 2009 and winter 2010	White perch, carp, largemouth bass, pumpkinseed, smallmouth bass, striped bass, and white sucker	Riprap, gravel, wooden bulkhead with overhanging vegetation, cement debris, silt substrate
Reach 5								
LPR5J	592097	717356	East	9.75	Eel trap, minnow trap, trotline	Late summer/ early fall 2009 and winter 2010	American eel, carp, largemouth bass, pumpkinseed, smallmouth bass, white sucker, banded killifish, bluegill, and spottail shiner	Mud, gravel, riprap, aquatic grass, and shrubs, trees on bank
LPR5M	590284	712972	West	8.75	Eel trap, minnow trap, and trotline	Late summer/ early fall 2009 and winter 2010	American eel, white sucker, and tessellated darter	Above the confluence with the Second River; concrete wall with some overhanging vegetation; depositional area characterized mostly by silt
LPR5Q	592183	717297	East	9.75	Electrofishing	Late summer/ early fall 2009 and winter 2010	Banded killifish, bluegill, common carp, largemouth bass, pumpkinseed, smallmouth bass, spottail shiner, striped mullet, and white perch	Overhanging vegetation, concrete block structures; next to county park
LPR5S	589702	711831	West	8.5	Electrofishing	Late summer/ early fall 2009	Banded killifish, common carp, pumpkinseed, redbreast sunfish, spottail shiner, white catfish, white perch, and largemouth bass	Near the N Arlington bridge; overhanging vegetation, riprap

QAPP Worksheet No. 18. Proposed Sampling Locations for the Late Spring/Early Summer 2010 Fish Community Survey

Sampling Location[a]	Easting (X)[b]	Northing (Y)[b]	Bank	RM	Fishing Method[c]	Previous Survey Event	Species Previously Collected[d]	Description and Rationale for Sampling Location[e]
Reach 6								
LPR6A	592574	722245	East	10.7	Eel trap, minnow trap, and trotline	Late summer/ early fall 2009 and winter 2010	American eel, brown bullhead, pumpkinseed, smallmouth bass, white sucker, bluegill, and rock bass	Shallow mudflat with gravel and overhanging trees and vegetation; depositional area characterized mostly by gravel and sand and silt and sand
LPR6D	595137	724114	West	11.4	Eel trap, minnow trap, and trotline	Late summer/ early fall 2009 and winter 2010	White perch, pumpkinseed, and tessellated darter	Above the confluence with Third River; shallow mudflat with overhanging vegetation and trees; substrate of mostly gravel and sand and silt and sand
LPR6L	596201	724678	East	11.6	Electrofishing	Late summer/ early fall 2009	Common carp, northern pike, smallmouth bass, white perch, and white sucker	Rocky with large woody debris, overhanging trees; deeper water; upstream of Conrail-Lyndhurst draw bridge
LPR6N	592325	722258	West	10.7	Electrofishing	Late summer/ early fall 2009	Common carp, white perch, and white sucker	Concrete wall adjacent to McCarter Highway; vegetation and overhanging trees
Reach 7								
LPR7D	597447	734889	East	13.7	Eel trap, minnow trap, and trotline	Late summer/ early fall 2009 and winter 2010	American eel and redbreast sunfish	Shallow mudflat with riprap and overhanging trees; depositional area characterized mostly by silt and sand
LPR7Q	596587	729111	West	12.5	Eel trap, minnow trap, and trotline	Late summer/ early fall 2009 and winter 2010	American eel, white perch, white catfish, channel catfish, bluegill, and tessellated darter	Shaded with trees; rocks, large woody debris, deeper water
LPR7R	597139	734602	West	13.5	Electrofishing	Late summer/ early fall 2009	White sucker	Rocky shoreline, overhanging trees

QAPP Worksheet No. 18. Proposed Sampling Locations for the Late Spring/Early Summer 2010 Fish Community Survey

Sampling Location[a]	Easting (X)[b]	Northing (Y)[b]	Bank	RM	Fishing Method[c]	Previous Survey Event	Species Previously Collected[d]	Description and Rationale for Sampling Location[e]
LPR7U	596913	728915	East	12.4	Electrofishing	Late summer/ early fall 2009	American eel, bluegill, and pumpkinseed	Rocky shoreline, over hanging trees, shallow water
Reach 8								
LPR8K	597509	737734	East	14.2	Eel trap, minnow trap, trotline	Late summer/ early fall 2009 and winter 2010	Largemouth bass, bluegill, channel catfish, and redbreast sunfish	Across from the Dundee Canal; concrete wall, shallow mudflat with overhanging trees, purple loosestrife and vegetation along shoreline
LPR8U	600528	737366	West	15.1	Eel trap, minnow trap, trotline	Late summer/ early fall 2009 and winter 2010[f]	American eel, bluegill, common carp, pumpkinseed, redbreast sunfish, smallmouth bass, white perch, and white sucker	Overhanging trees along shoreline
LPR8W	599277	741575	West	16	Electrofishing	Late summer/ early fall 2009	American eel, bluegill, common carp, gizzard shad, largemouth bass, pumpkinseed, redbreast sunfish, smallmouth bass, white perch, and white sucker	Under silver bridge
LPR8Y	596961	746132	East	17.1	Electrofishing	Late summer/ early fall 2009	American eel, bluegill, largemouth bass, pumpkinseed, redbreast sunfish, rock bass, and tessellated darter	Mostly gravel and cobble with overhanging trees and vegetation on bank

[a] Proposed sampling locations for eel traps, minnow traps, and trotlines were targeted during the winter 2010 fish community survey. Proposed electrofishing/gillnet locations are where electrofishing or gillnets were used during the late summer/early fall 2009 fish community survey and where the greatest abundance and diversity of fish species were caught using those methods.

[b] New Jersey State Plane (US survey ft).

[c] Electrofishing or the use of gillnets will be determined based on salinity (as determined by field measurements of conductivity). Ideal conductivity for electrofishing is between 0.04 and 0.4 mS/cm; electrofishing is less efficient in water with high conductivity. Therefore, gillnets will be used at locations where conductivity exceeds 0.4 mS/cm, unless USEPA and CPG agree to conduct electrofishing in these areas.

QAPP Worksheet No. 18. Proposed Sampling Locations for the Late Spring/Early Summer 2010 Fish Community Survey

[d] The fish species previously collected at the selected sampling location during the late summer/early fall 2009 and winter 2010 fish community surveys.

[e] The sampling location description is based on field observations during the late summer/early fall 2009 fish community survey (Windward 2010a). Substrate type is based on Malcolm Pirnie (2006).

[f] LPR2G was added to the winter 2010 fish community survey to replace LPR2E at the request of USEPA. LPR8U was added to the winter 2010 fish community survey to replace LPR8D, where fishing attempts were unsuccessful as a result of ice buildup.

RM – river mile

USEPA – US Environmental Protection Agency

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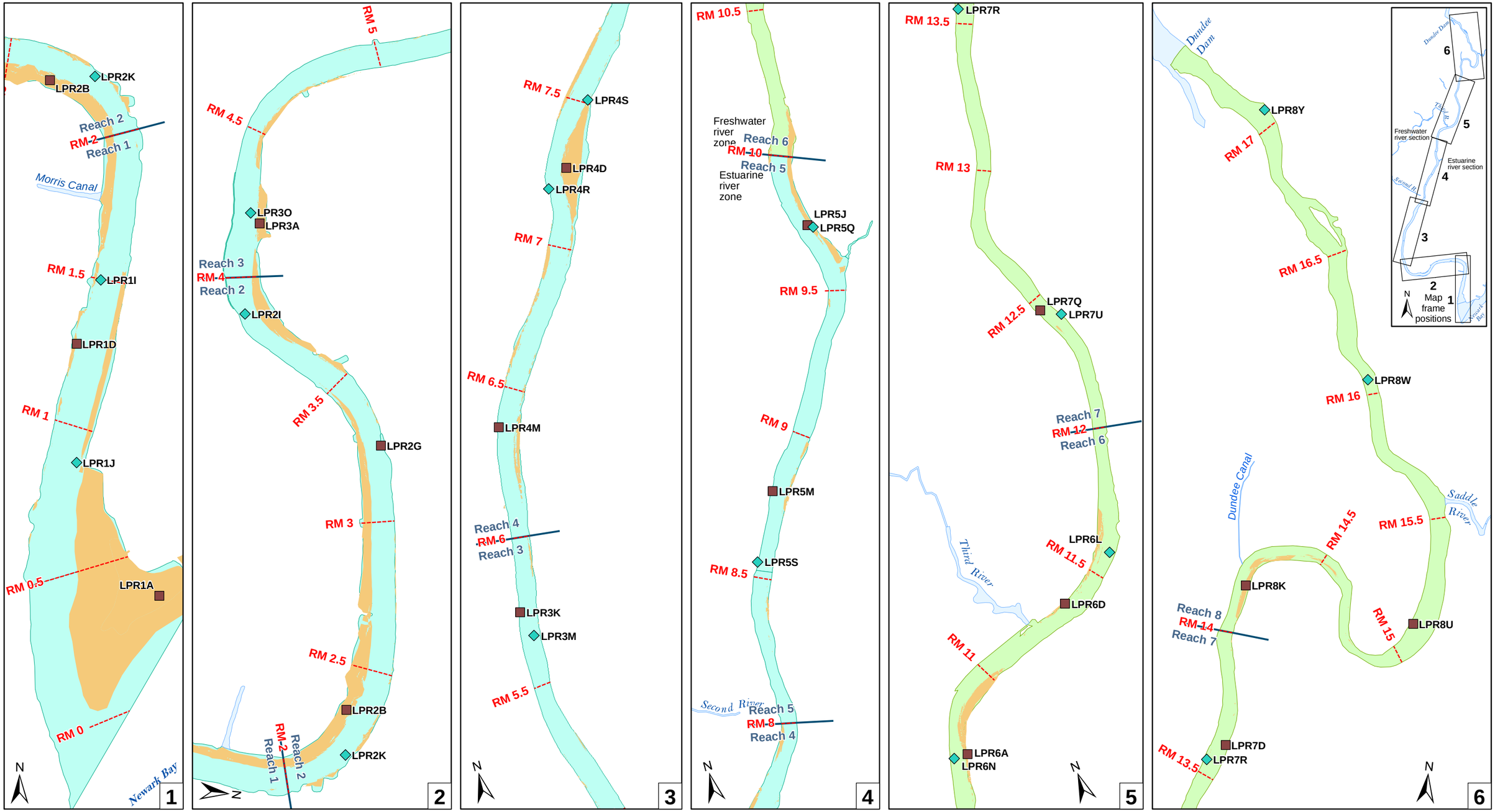
Oversize Figure



Wind Ward environmental LLC

0 0.5 1 Kilometers

0 0.25 0.5 Miles

- Traps and trotline
- Gillnet or electrofisher
- Sampling reach boundary
- Mudflat
- River mile
- LPRSA
  - Estuarine river section
  - Freshwater river section
  - Upper Passaic River or tributary

Mudflats are areas where the river bottom slope is ≤6° and the depth is ≤4.5 feet (1/2 the mean MLW to MHW tidal range,plus 2 feet).Mudflats were determined as those areas of fine (i.e., silt or sand) sediment substrate. LPRSA sediment grain size is based on shapefiles received from ENSR|AESOM, from the Draft Technical Report,Geophysical Survey: Lower Passaic River Restoration Project (Aqua Survey,Inc., 2005a). LPRSA bathymetry layer in all areas is based on the 2004 bathymetry data from Rogers Surveying (for USACE). The Kearney Point mudflat is outside the survey area and was estimated from NOAA bathymetry.

Figure 1. Proposed sampling locations for the late spring/early summer 2010 LPRSA fish community survey

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